APPENDIX C

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Arabidopsis transcriptional activators CBF1, CBF2, and CBF3 have matching functional activities.

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(Abstract)

When Arabidopsis is exposed to low temperature a small gene family encoding transcription factors known as CBF1, CBF2, and CBF3 (also referred to as DREB1b, DREB1c, and DREB1a, respectively) is rapidly induced followed by expression of CBF-targeted genes, the CBF regulon, which act to bring about an increase in freezing tolerance. The CBF1, 2 and 3 proteins, though highly similar in amino acid sequence, are not identical, raising the question of whether the proteins have the same functions. Here we explored this issue by comparing the effects that overexpression of each CBF gene had on Arabidopsis growth and development, proline and sugar composition, freezing tolerance and gene expression. Taken together, the results support the conclusion that the CBF1, 2 and 3 transcriptional activators have redundant functional activities.